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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM L. BRENNEMAN, ANDREW VACCO,
and SZUCHAIN F. CHEN

Appeal 2009-005694
Application 10/727,920
Technology Center 1700

Decided: March 30, 2010

Before BRADLEY R. GARRIS, PETER F. KRATZ, and
MARK NAGUMO, *Administrative Patent Judges*.

KRATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1, 3-6, and 8-12. We have jurisdiction pursuant to 35 U.S.C. § 6.

Appellants' claimed invention is directed to a smooth surface copper foil (surface has an R_z of less than about one micron) and having a peel strength enhancement coating consisting essentially of a metal and metal oxide mixture deposited thereon. An article including a peel strength enhanced foil is also claimed. Further details of the claimed subject are evident from a reading of the appealed independent claims 1 and 6, which are reproduced below:

1. A smooth surface copper foil for lamination to a dielectric substrate, the copper foil comprising:

a peel strength enhancement coating deposited on a smooth surface of the copper foil having an R_z of less than about $1\text{ }\mu\text{m}$ to be laminated to said dielectric substrate, the peel strength enhancement coating consisting essentially of a metal and metal oxide mixture, the metal and metal oxide mixture being formed from one or more of: vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium.

6. An article comprising:

a dielectric substrate;

a copper foil having a smooth surface with an R_z less than about $1\text{ }\mu\text{m}$ laminated to the dielectric substrate; and

a peel strength enhancement coating disposed between the smooth surface of the copper foil and the dielectric substrate, said peel strength enhancement coating being a mixture of a metal and a metal oxide with said metal selected from the group consisting of one or more of vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, and rhenium, wherein the copper foil exhibits less than or equal to 10% loss of peel strength when measured [sic] in accordance with IPC-TM-650 Method 2.4.8.5 using a 1/8 inch test specimen after being immersed in 4N HCl at 60°C for 6 hours,

The Examiner relies on the following prior art reference as evidence in rejecting the appealed claims:

Lin	5,071,520	Dec. 10, 1991
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In addition, Appellants furnish additional evidence in the form of a declaration under 37 C. F. R. § 1.132 by Dr. Brenneman, a named co-inventor of the subject Application.

The Examiner maintains the following ground of rejection:

Claims 1, 3-6, and 8-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lin.

We reverse substantially for the reasons set forth by Appellants in the Appeal Brief¹ and Reply Brief.

In maintaining the rejection, the Examiner states that Lin “is silent about the surface roughness of the copper foil over which the peel strength enhancement coating is coated” and is likewise silent about the peel strength enhancement coating thickness (Ans. 4).

The Examiner argues that:

In view of Lin's teaching, one skill[ed] in the art would choose a surface condition of the copper foil and the thickness of the peel enhancement coating because it has been held that the discovery of workable ranges of result-effective variables, such as surface roughness or thickness would be within the ordinary skill of the art.

Ans. 4.

Appellants contend that:

¹ Our references to the Appeal Brief (App. Br.) herein are to the replacement Appeal Brief filed October 14, 2008.

The copper foil of claims 1 and 6 is not obvious in view of Lin, because:

1) Lin makes no disclosure of a smooth copper foil, on which a peel strength enhancing coating is applied;

2) Lin only teaches or suggests the application of a treatment coating to a roughened or dendritic treated copper foil;

3) A smooth copper foil would not have been a matter of design choice, since Lin's teachings to provide a roughened/dendritic copper foil to improve peel strength teaches away from smooth copper foils, and would lead one skilled in the art in a direction divergent from the path taken by the Appellant in using a smooth copper foil; and

4) The Appellant's smooth copper foil would not have been "obvious to try" given Lin's teaching towards roughened copper foils for improving peel strength, and the unpredictability associated with chemical processes such as the present application of a coating treatment to a smooth copper foil as described in the Appellant's specification.

App. Br. 6.

A principal issue before us is:

Has the Examiner established Lin teaches or suggests to one of ordinary skill in the art a product including a smooth surface copper foil coated with a metal and metal oxide mixture that corresponds to Appellants' product, by a preponderance of the evidence of record in this appeal?

We answer this question in the negative.

FINDINGS OF FACT

The Specification states "[t]he term 'smooth', as used herein means a low profile surface, e.g., less than 1 μm Rz, where Rz is the average of five peak to valley distance measurements as measured using a surface profilometer" (Spec. 5, ll. 1-5).

Lin discloses treating copper and copper-based alloy foils to improve peel strength upon lamination with materials, such as a dielectric support (col. 1, ll. 5-33). Lin teaches roughening the surface of the foil to maximize adhesion, such as by the formation of dendrites thereon, and treating the surface to inhibit tarnishing thereof (e.g., with chromic and phosphoric acids), which additional treatment allegedly further improves peel strength (col. 1, ll. 34-48 and col. 2, ll. 38-55). Lin teaches that, subsequent to the anti-tarnish treatment, the foil is subjected to a rinse treatment with an aqueous solution containing an effective amount of a silane coupling agent to further increase peel strength and minimizes peel strength decay during subsequent storage (col. 2, l. 64 –col. 3, l. 3). Lin provides further details throughout the patent (*see*, e.g. col. 3, l. 10, col. 4, l. 53, and Examples A-E).

Dr. Brenneman, in a declaration under 37 C. F. R. § 1.132, states, *inter alia*, that Lin (U.S. Patent No. 5, 071, 520) does not include information that “teaches or suggests a smooth copper foil having a peel strength enhancement coating deposited onto the surface of the copper foil to be laminated to a dielectric substance” (Decl. 15).

PRINCIPLES OF LAW

It is well settled that the burden of establishing the non-patentability of the rejected claims resides with the Examiner. *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

A sustainable obviousness rejection must be accompanied by “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)

(quoted with approval in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417-18 (2007)).

Rejections based on § 103(a) must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. *See In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967).

ANALYSIS

The Examiner falls short of presenting a sustainable obviousness rejection, at the outset, by failing to appropriately take into account the teachings of Lin with respect to roughening the foil surface for enhancing peel strength as opposed to the here-claimed requirement for a particularly specified level of smoothness for the copper foil surface that is coated.

This faulty start is not rescued by the Examiner's response on page 5 of the Answer to Appellants' asserted product distinction concerning the claimed smooth foil surface. In this regard, the Examiner states that:

The only question in dispute is that whether Appellant's invention is obvious over Lin's teaching. Appellant argues that Lin is roughening the copper foil surface, whereas the present invention teaches a smooth surface. The examiner however views "smooth" and "rough" [as] relative terms, and Lin describes a copper foil similar to that of the appellant's. One of ordinary skill would have found it obvious to determine the range of roughness, including R_z to be about 1 μm .

Manifestly, the claim term "smooth" has not been shown by the Examiner to be relative given the definition for this term furnished by Appellants in the Specification (Spec. 5, ll. 1-5). Nor has the Examiner persuasively articulated where Lin provides direction toward use of a copper foil with the claimed surface smoothness coated with the claimed metal and

metal oxide mixture, as argued by Appellants (App. Br. 6-13; Reply Br. 1-5).

On this record, the Examiner has not carried the burden to reasonably establish that Lin teaches or suggests to one of ordinary skill in the art a copper foil having a smooth surface coated with a metal and metal oxide mixture, or an article including such a coated foil as part thereof, as required by the appealed claims. Consequently, we do not reach Appellants' unexpected result assertions in reversing the stated rejections.

ORDER

The Examiner's decision to reject claims 1, 3-6, and 8-12 under 35 U.S.C. § 103(a) as being unpatentable over Lin is reversed.

REVERSED

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